

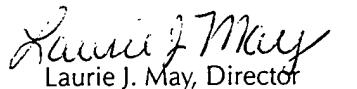
# **Medicare Risk HMO Withdrawals: Implications for Medicare Subvention**

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# Introduction

The Department of Defense (DOD) is working with the Department of Health and Human Services (DHHS) to develop for its Medicare-eligible beneficiaries a cost-effective alternative for delivering access to quality care. This alternative, commonly called TRICARE Senior Prime, will give Medicare-eligible beneficiaries the opportunity to enroll in Prime with primary care managers (PCMs) at military treatment facilities (MTFs). TRICARE Senior Prime enrollees will have the same priority access to MTF care as military retirees and retiree family members currently enrolled in Prime. At present, this program is in the demonstration phase, with sites at the following locations:

- Keesler Air Force Base, Biloxi, MS
- Wilford Hall Medical Center and Brooke Army Medical Center, San Antonio, TX; Fort Sill, Lawton, OK; and Sheppard Air Force Base, Wichita Falls, TX
- Fort Carson and the Air Force Academy, Colorado Springs, CO
- Madigan Army Medical Center, Fort Lewis, WA
- Naval Medical Center, San Diego, CA
- Dover Air Force Base, Dover, DE.

This demonstration, known as Medicare subvention, is being conducted under the authority of section 1896 of the Social Security Act, as added by section 4015 of the Balanced Budget Act of 1997 (BBA 97).

If DOD decides to make TRICARE Senior Prime a nationwide program, its role will be to provide its Medicare-eligible beneficiaries a Medicare+Choice risk HMO plan. As a consequence, it will have to meet DHHS's requirements of such plans.

For almost 20 years, Medicare beneficiaries have been able to enroll in HMOs. In order to serve them, HMOs have had to enter into contracts with the Health Care Financing Administration (HCFA). HCFA has required them to offer their enrollees at least the same mix of services that are offered under Medicare fee for service. Participating HMOs have received capitated payments from HCFA in exchange for serving these beneficiaries. Many Medicare HMOs have offered their enrollees additional benefits, such as lower out-of-pocket payments and prescription drug coverage.

BBA 97, along with establishing Medicare subvention, brought many changes to the Medicare HMO program. One of these changes was the creation of the Medicare+Choice program, which started in January 1999. The introduction of the program has changed the requirements for participating plans. For instance, plans now must implement more comprehensive quality improvement programs and report more information to HCFA and to enrollees, increasing the administrative burden of program participation.

DOD should be concerned that many managed care plans have either withdrawn from the Medicare+Choice program entirely or reduced their service areas in the last couple of years as the Medicare+Choice program has been phased in. According to DHHS, such withdrawals affected about 407,000 Medicare+Choice enrollees in 1999 and about 327,000 enrollees in 2000.

This is not the only period in which the number of Medicare risk HMO contracting organizations has dropped significantly (see table 1). It also occurred in the late 1980s; at that time, however, the number of Medicare risk HMO contractors had grown rapidly in the preceding years while enrollment in such plans had not grown fast enough to increase enrollment per contractor to a viable level. In 1988, there were slightly fewer than 7,000 enrollees per contracting organization. In 1991, after about one-third of the organizations had withdrawn, there were about 15,000 enrollees per contracting organization, and the number of organizations had fallen to 93. The 1990s experienced a large increase in both Medicare risk HMO enrollment and the number of managed care contracting organizations, to about 6 million enrollees and 346 contractors in 1998. By 1998, enrollment

per contractor was roughly 17,500. Thus, one explanation for the withdrawals of 1988-91 is the fact that enrollment had not grown fast enough in the middle to late 1980s to support the huge increase in the number of contractors. We cannot offer as simple an explanation for why over 10 percent of the contractors withdrew from the program and countless others reduced their service areas in 1999. The purpose of this report is to determine what factors have played a part in these withdrawals and how this could affect the viability of the TRICARE Senior Prime program.

Table 1. Medicare risk HMO enrollment and managed care organization participation, 1985-99

Year	Contractors	Enrollees	Enrollees per contractor
1985	87	500,000	5,747
1986	149	800,000	5,369
1987	161	1,000,000	6,211
1988	154	1,050,000	6,818
1989	131	1,100,000	8,397
1990	96	1,200,000	12,500
1991	93	1,400,000	15,053
1992	96	1,600,000	16,667
1993	110	1,800,000	16,364
1994	148	2,200,000	14,865
1995	181	3,100,000	17,127
1996	241	4,100,000	17,012
1997	307	5,200,000	16,938
1998	346	6,050,000	17,486
1999	310	6,250,000	20,161

Source: [1].

# **Factors that may affect plan withdrawal and service area reductions**

The basic economic theory of the firm states that a typical firm produces at a level to maximize its profits. Sales of any goods produced provide a revenue stream for the firm, whereas expenditures for inputs into the production and marketing process represent the costs of bringing the goods to market. A profit-maximizing firm simply produces at a level at which the difference between revenue and cost is greatest. Even nonprofit firms, of which there are many in the managed care industry, are very conscious of revenue and cost levels. Therefore, a natural place to look for factors that affect risk HMO participation in particular counties would be factors that affect revenues and costs in those counties.

## **County-specific factors**

Probably the most important county-specific factor affecting plan withdrawal is the capitated payment rate at which Medicare reimburses risk HMOs. This is called the adjusted average per capita cost (AAPCC) rate. The AAPCC rate is set at the county level, and has traditionally been linked to the health care costs of each county's fee-for-service Medicare beneficiaries. More precisely, Medicare has traditionally paid participating risk HMOs a capitated rate equal to 95 percent of the average fee-for-service beneficiary costs in each county.<sup>1</sup> The size of the capitated payment has an obvious effect on plan revenues. In reality, it represents the revenues the plan generates from offering a Medicare risk HMO product in a given county.<sup>2</sup>

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1. The Health Care Financing Administration (HCFA) is developing payment rates that will be adjusted based on each enrollee's risk profile, but these have not been phased in yet.
  2. Under Medicare subvention, DOD is being reimbursed at only 95 percent of the AAPCC rate for each county in which it operates as a Medicare HMO.

A number of studies have found that the AAPCC rates have a big effect on plan participation in those counties. In one of the better studies [2], Jean Abraham and colleagues looked at risk HMO participation from 1990 to 1995 and found that the AAPCC rate is the primary determinant of HMO participation. In particular, they found that the elasticity of the probability of entry with respect to the AAPCC rate is equal to 1.39, which suggests a large behavioral response by HMOs.<sup>3</sup> An earlier study [3] looked at Medicare risk market entry in 1986 and found an even stronger result. The elasticity of the probability of entry with respect to the AAPCC rate was almost 2.4.

The payment rate is not the only county-specific factor that could affect Medicare risk HMO participation and withdrawal decisions. Characteristics of the medical care market in the county could affect plan costs. For instance, medical care providers are in a relatively weak bargaining position vis-a-vis managed care organizations when there are several providers in an area. The more providers in a market, the more likely they are to strive to ensure that they can see enough patients to remain viable. In this situation, they would compete vigorously to become managed care network members to guarantee access to serving the beneficiaries enrolled with managed care organizations. Thus, we might expect costs to be lower in counties with many providers.

Characteristics of the beneficiary population in each county may also affect plan withdrawal decisions. Reference [3], for instance, found a positive relationship between the percentage of a county's Medicare population that is female and the likelihood that a plan offers a Medicare risk HMO product in the county. It also found a negative relationship between the percentage of a county's Medicare population that is white and the likelihood that a plan offers such a product there. Abraham et al. [2] found a relationship between the age composition of a county's Medicare population and the likelihood of plan participation. They found that the younger the Medicare

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3. An elasticity of 1.39 indicates that a 1-percent increase in the payment rate in a given county would lead to a 1.39-percent increase in the likelihood that a given HMO would offer a Medicare risk HMO product in that county.

population, the more likely it is that a given managed care organization will offer its product in the county.

Household income is also likely to be a factor, especially if one holds the Medicare payment rate constant. Numerous studies have shown that health care is a normal good for all segments of the population. In other words, all other things being equal, people with higher incomes tend to consume more health care than those with lower incomes. Higher health care utilization leads to higher costs for managed care organizations. To the extent that this higher utilization is not captured in the AAPCC rate, it will increase the probability that a Medicare risk HMO will withdraw from the county. Thus, we would expect a positive relationship between household income and plan withdrawal.

Finally, the level of urbanization of a county is likely to be related to HMO participation. In studies of HMO market penetration, researchers typically find that HMO penetration, as measured by the percentage of the population enrolled in HMOs, is higher in urban areas. See [4], for instance. Therefore, our supposition is that Medicare risk HMOs will be less likely to withdraw from more urbanized areas.

### **Plan-specific factors**

A number of plan-specific factors could influence a risk HMO's decision to withdraw from certain markets. First, we expect that for-profit HMOs would be more likely to withdraw from certain areas because they are more sensitive to changes in revenue and cost structures. We would also expect a plan's Medicare risk market penetration, as measured by its percentage of the total Medicare risk HMO enrollment in a county, to be an important factor. For instance, we would expect those organizations that command more of the Medicare risk HMO market in a county to be less likely to withdraw and those with less market power to be more likely to withdraw.

Another plan-specific factor that is likely to be important is whether the plan is federally qualified. Federally qualified plans have typically had to submit relatively detailed financial statements to DHHS in order to maintain their status. The additional regulatory burdens placed on Medicare risk HMOs starting in 1999 as a result of BBA 97

are likely to have created less of a burden for the federally qualified HMOs than for non-federally-qualified HMOs.

Finally, the HMO model type could influence withdrawal. Group and staff models are more likely to be able to control utilization and cost than open panel models and, thus, are more likely to succeed in Medicare risk markets. At the same time, open-panel individual practice association (IPA) and network models could be less likely to withdraw. These HMOs have the incentive of preserving existing Medicare patient panels of their member physicians (see [3]).

# Data and methods

## The data

To analyze the effects of the county- and plan-specific factors on Medicare risk HMO withdrawal, we had to collect data from a variety of sources.<sup>4</sup> The Health Care Financing Administration (HCFA), the agency within DHHS that runs the Medicare program, has made available data on the service areas of participating HMOs. The data are readily available on HCFA's website. We started with plan service areas as of September 1998. The data are organized so that each plan-county pair represents an observation. To identify cases in which plans withdrew from certain counties, we used a HCFA-provided list of all plan withdrawals and service area reductions for 1999.<sup>5</sup>

We then had to match these data to data on plan-specific characteristics by using data from the *InterStudy Competitive Edge Part I: HMO Directory* [5]. To develop the directory, InterStudy conducts an annual census of HMOs. The data on HMO plan characteristics come from the census conducted over the summer of 1998 and were the most appropriate data to use given that we wanted to look at changes in HMO Medicare participation between 1998 and 1999. The directory includes data on model type, tax status (for profit or non-profit), federal qualification, plan age, and plan affiliation, among other things. We matched this information to our HCFA-provided information on the service areas of participating plans.

We also had to match our service area data to data on county characteristics. Some of the county characteristics data came from HCFA's website. For instance, we obtained data on Medicare HMO capitated

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4. In table 5, in the appendix, we list the source of each variable we used in the analysis.
  5. We also used the service area data to determine how many Medicare HMOs served each county in 1998.

payment rates for each county for both 1998 and 1999 from HCFA. We also obtained county level data on the total number of Medicare beneficiaries and the total number of Medicare HMO enrollees from this source. Finally, we obtained county-level Medicare beneficiary enrollment figures for each specific participating plan. From these data, we were able to determine the general HMO penetration rate among Medicare beneficiaries in each county, as well as the penetration rate for each particular plan in each county.

Other county-specific data came from the Area Resource File (ARF). The ARF data are compiled from various sources by the Office of Research and Planning at the Bureau of Health Professions. The data are provided at the county level and include data from the American Medical Association physician census files, various U.S. Census and Current Population Survey files, and the American Hospital Association County Hospital Files. The ARF includes data on the numbers of various types of practicing physicians and other providers, hospitals, hospital beds, and tertiary care units. It also includes data on various resident population characteristics, such as total population, racial composition, gender composition, age composition, and median household income.

## The model

The purpose of our analysis is to determine why certain Medicare risk HMOs withdrew from certain counties between the 1998 and 1999 contract years. One natural way of modeling this is to allow the probability that a particular plan will withdraw from a particular county to be a function of plan and county characteristics. Mathematically, this is written as:

$$\text{Prob}(W_{i,j}) = f(X_i, Y_j).$$

The above equation simply restates what we said above, that the probability that plan  $i$  will withdraw from county  $j$  is a function of plan characteristics  $X_i$  and county characteristics  $Y_j$ . Table 2 lists the county and plan characteristics used to explain plan withdrawal.

Table 2. Explanatory variables used in our models

<b>Plan characteristics</b>
Model type (group, staff, IPA, network, mixed)
Tax status (for profit or not for profit)
Federal qualification status
Plan penetration in county (% of total county Medicare HMO enrollment)
Plan enrollment in county
<b>County characteristics</b>
AAPCC rate, 1999
Change in AAPCC rate, 1998-1999
Providers per capita (general practice, specialists, surgeons, nurses)
Number of hospitals
Number of hospital beds
Presence of tertiary care unit (such as intensive care unit)
Number of Medicare HMOs serving the county
Medicare HMO penetration rate (% of beneficiaries enrolled in HMOs)
Medicare beneficiary population
Total Medicare HMO enrollment
Percentage of Medicare population that is male
Percentage of Medicare population that is white
Age distribution of Medicare population
Median household income
Degree of urbanization

A linear model could be used here, but estimating probabilities with such a model is not proper. A minor difficulty is that the error term in such a linear regression model would be heteroscedastic in a way that depends on the coefficients on the explanatory variables. This could be dealt with by using a feasible generalized least squares estimator (see [6], p. 637). An even bigger problem is that a linear model will generate predicted probabilities that are larger than 1 and less than 0. Such probabilities are, of course, impossible.

A model that can be used in this case is a nonlinear model known as the probit model. The probit model can be motivated as follows. Suppose there is some unmeasured latent variable,  $w_{ij}^*$ , which is a linear function of our explanatory variables and an unknown disturbance term. The latent variable in this case is likely to be the difference between the revenues generated for plan  $i$  by operating in county  $j$

between the revenues generated for plan  $i$  by operating in county  $j$  and the costs associated with these operations. The dependent variable that is actually observed is whether or not the plan withdraws from the county. The probit model, in our case, is motivated by assuming that if  $w_{i,j}^*$  falls below some threshold value, plan  $i$  will withdraw from county  $j$ . We make a further assumption about the disturbance term. To generate a probit, we assume that the disturbance term is distributed normally with a mean of 0. The advantage of the probit model over the linear probability model is that it yields predicted probabilities that always lie in the acceptable range of 0 to 1. Because of this, it is widely used to model probabilities.

# Results

## Descriptive statistics

Our data set included 2,871 plan-county pairs for Medicare risk HMOs.<sup>6</sup> For our analyses, we had to drop all group and staff model HMOs because none of these plans withdrew from any counties in 1999. Thus, our final data set consisted of 2,744 observations.<sup>7</sup> In table 3, we compare the means of each of our explanatory variables for those observations in which plans did and did not withdraw.

A few trends emerge from the descriptive statistics. First, it appears that plans tended to withdraw from counties with lower Medicare HMO capitated payments, with fewer providers (especially nurses), and with fewer hospitals and hospital beds and lower levels of Medicare HMO penetration. These counties also typically had fewer Medicare beneficiaries and fewer Medicare HMO enrollees. There are also small differences in the makeups of the Medicare populations. Finally, plans tended to withdraw from nonurban counties.

As far as plan characteristics are concerned, we find a much higher proportion of for-profit HMOs among the withdrawals than among the nonwithdrawals. Also, the plans that tended to withdraw tended to do so when they had relatively few Medicare enrollees and a lower share of the total Medicare HMO enrollment in the county.

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6. We limited our study to Medicare risk HMOs because TRICARE Senior Prime will operate as a risk HMO.
  7. This could raise issues of bias in our sample; however, because we had to drop fewer than 5 percent of our observations, we feel confident that any bias is small. We also included group and staff HMOs in a linear probability model and found results that were similar to the probit results.

Table 3. Comparison of mean attributes between nonwithdrawal and withdrawal cases

Explanatory variable	Nonwithdrawal	Withdrawal
	County characteristics	
AAPCC rate, 1999	\$497.06	\$487.93
Change in AAPCC rate, 1998-99	\$10.15	\$9.90
General practitioners per 10,000	2.61	2.51
Specialists per 10,000	6.48	6.20
Surgeons per 10,000	4.37	4.07
Nurses per 10,000	33.29	27.94
Number of hospitals	7.35	5.77
Number of hospital beds per 10,000	35.36	31.28
Presence of tertiary care unit (=1)	0.83	0.78
Number of Medicare HMOs	5.56	5.47
Medicare HMO penetration (%)	20.1	18.8
Number of Medicare HMO enrollees	16,959	12,375
Number of Medicare beneficiaries	61,158	48,244
% of Medicare population male	42.9	43.4
% of Medicare population white	91.1	88.9
% of Medicare population under 75	58.6	59.2
% of Medicare population 75-84	31.8	31.4
Urban county (=1)	0.786	0.725
Median household income	\$37,528	\$39,377
Plan characteristics		
Plan characteristics missing (=1)	0.128	0.058
Model type		
IPA (=1)	0.447	0.541
Network (=1)	0.067	0.024
Mixed (=1)	0.358	0.377
For profit (=1)	0.678	0.857
Federally qualified (=1)	0.533	0.537
Plan Medicare enrollment in county	2,197	767
Plan Medicare HMO penetration in county (%)	26.5	20.5

Note: The (=1) indicates that the variable is an indicator variable. For example, the For Profit variable is equal to 1 for observations on for-profit plans and equal to 0 for observations on nonprofit plans.

## Probit model results

We present results from our probit model in table 4. We estimated a number of models but report only the results of the most successful model here.<sup>8</sup> As we expected, the AAPCC rate had a significant impact on plan withdrawal and service area reduction decisions in 1999. The coefficient is negative and statistically significant, indicating that plans were less likely to withdraw from counties with higher AAPCC rates even after controlling for other county- and plan-specific factors. We calculated the elasticity of the probability of plan withdrawal with respect to the AAPCC rate at the means of the explanatory variables. Our estimate of the elasticity is 1.11, which is very similar to, if slightly lower than, the elasticity found by Abraham et al. [2]. Our results still indicate that Medicare risk HMOs are very responsive to the level of capitated payments in each county. At the same time, we found no statistically significant relationship between the change in the AAPCC rate from 1998 to 1999 and plan withdrawal. This result may be due to the fact that the increases in the payment rates could not even begin to account for the costs of the additional regulatory burdens laid upon risk HMOs in 1999 under the transition to Medicare+Choice as specified in BBA 97.

Another result that is not surprising is that for-profit plans were more likely to withdraw in 1999 than nonprofit plans. This is consistent with our earlier assertion that for-profit HMOs are more sensitive to the profitability of their operations in individual counties than are non-profit HMOs. At the same time, plans were less likely to withdraw from counties where they had relatively higher Medicare enrollments in 1998. They were also less likely to withdraw from counties where their enrollments accounted for a relatively greater proportion of total Medicare HMO enrollment. This indicates that plan withdrawal could be a symptom of underenrollment in certain plans. Plans withdrew from counties where they could not attract enough of the Medicare HMO market to make it worthwhile to continue.

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8. The basic results were very robust across various specifications.

Table 4. Probit model results

Explanatory variable	Coefficient	Standard error
<b>County characteristics</b>		
AAPCC rate, 1999	-0.00148*	0.00054
Change in the AAPCC rate, 1998-99	-0.01381	0.01574
General practitioners per capita	-230.66	274.29
Specialists per capita	173.68	161.85
Surgeons per capita	121.38	299.28
Nurses per capita	-57.65*	25.70
Number of hospitals	0.00260	0.00294
Number of hospital beds per capita	-9.2223	12.595
Presence of tertiary care unit (=1)	0.13373	0.09174
Number of Medicare HMOs	-0.00498	0.01611
Medicare HMO penetration (%)	-0.17445	0.31720
% of Medicare population male	7.2097*	1.9417
% of Medicare population white	-1.6245*	0.32872
% of Medicare population under 75	-0.74680	2.8473
% of Medicare population 75-84	-2.7418	4.2262
Urban county (=1)	-0.31628*	0.09241
Median household income (1,000s)	0.01690*	0.00477
<b>Plan characteristics</b>		
Plan characteristics missing (=1)	-0.07576	0.13342
Model type (base: mixed)		
IPA (=1)	0.00409	0.06450
Network (=1)	-0.65140*	0.17093
For profit (=1)	0.58540*	0.09042
Federally qualified (=1)	-0.09271	0.06232
Plan Medicare enrollment in county (1,000s)	-0.06090*	0.01710
Plan Medicare HMO penetration in county (%)	-0.46938*	0.13224

\* Coefficient is statistically different from 0 at the 0.05 level.

Note: The (=1) indicates that the variable is an indicator variable. For example, the For Profit variable is equal to 1 for observations on for-profit plans and equal to 0 for observations on nonprofit plans.

Another plan characteristic that mattered is model type. Our results indicate that network-model HMOs were less likely to withdraw than mixed-model HMOs. As we stated earlier, none of the group or staff model HMOs withdrew from any counties that they served. This

indicates that such plans have managed to control utilization and costs well enough to succeed in the Medicare risk market.

Among county-specific factors, the number of providers did not seem to matter much except in the case of nurses. This is particularly interesting since it reflects one of the results of [2]. The authors of that analysis included each county's average fee for office visits as well as each county's average nurse wage rate. They found a very similar result to ours. The average office visit cost did not matter, but the likelihood that a plan would offer a Medicare HMO product in a county was negatively related to the nurse wage rate. We found that plans are less likely to withdraw from counties that have more nurses per capita, and possibly lower average nurse wages.

The gender and racial compositions of the Medicare population in a county are also significantly related to the likelihood that a plan withdrew from the county in 1999. Plans were more likely to withdraw from counties with a higher percentage of men among Medicare beneficiaries. This result is similar to that of [3], which found that Medicare HMOs were more likely to enter markets with relatively more female Medicare beneficiaries. This is not very surprising because average Medicare reimbursements tend to be higher for men than for women. Also, Medicare risk HMOs were less likely to withdraw from counties with higher percentages of whites among their Medicare populations.

Finally, household income and degree of urbanization were important. Plans were more likely to withdraw from counties with relatively high median household incomes. This is not surprising, given our earlier assertions. Higher household income is generally associated with higher rates of health care utilization and, thus, higher costs to health care plans. Because we have controlled for the Medicare capitated payment rate and, therefore, held revenues constant, it is not surprising that we would get the result that higher household income would tend to increase the probability of plan withdrawal. Profits would be squeezed and plans would no longer participate. Finally, plans were less likely to withdraw from urban areas, which is not a surprising result.

## **Conclusions and ramifications for DOD**

The TRICARE Senior Prime program—currently in its demonstration phase—is a joint effort by DOD and DHHS to provide better access to care to DOD Medicare-eligible retirees and their dependents and survivors. As we stated earlier, each TRICARE Senior Prime site will, in effect, provide an HMO product as a Medicare+Choice risk HMO. As the law is currently written, for each Senior Prime enrollee, DOD will be reimbursed at a capitated rate equal to 95 percent of the AAPCC rate of each enrollee's county of residence. For example, DOD will be reimbursed at 95 percent of San Diego county's AAPCC rate for each NMC San Diego Senior Prime enrollee who resides in that county. For any enrollees who might live in southern Orange County, DOD will be reimbursed at 95 percent of that county's AAPCC rate. DOD should be concerned that, for the typical Medicare risk HMO, being reimbursed at only 95 percent of the AAPCC rate would increase its probability of withdrawing from a service area by over 5 percent, which is very significant. This raises serious questions about the financial viability of the Senior Prime program as it is currently designed.

There are other concerns as well. Our results indicate that risk HMOs were more likely to withdraw from counties with a high percentage of males in the Medicare population. For DOD, the important Medicare population will be the DOD-eligible Medicare population, which is much more heavily male than the general Medicare population. Unless capitated payment rates are adjusted to take this into account, the viability of the Senior Prime program will be undermined. DHHS is developing demographic-based adjustments to its capitated payment rates, and DOD should insist that these adjustments be applied to its Senior Prime enrollee populations.

On the other hand, one thing that Senior Prime has in its favor is that it most closely resembles a group or staff model HMO. We found that none of these types of HMOs either withdrew from the

Medicare+Choice program or reduced their service areas in 1999. As long as Senior Prime sites are successful in effectively managing utilization and costs, as other staff and group HMOs apparently have been, this bodes well for the viability of the program. Another encouraging factor is that Senior Prime is not meant to be a for-profit enterprise. Nonprofit HMOs were much more likely to stay in the Medicare risk market.

## **Appendix: Data sources**

In table 5, we present the specific data source for our dependent variable and each of our explanatory variables.

Table 5. Data sources

Variable	Data source
HMO withdrawal indicator	HCFA website
<b>County characteristics</b>	
AAPCC rate, 1999	HCFA website
Change in AAPCC rate, 1998-99	HCFA website
General practitioners per 10,000	AMA Physician Master File, 1997*
Specialists per 10,000	AMA Physician Master File, 1997*
Surgeons per 10,000	AMA Physician Master File, 1997*
Nurses per 10,000	County Hospital File, 1996*
Number of hospitals	County Hospital File, 1996*
Number of hospital beds per 10,000	County Hospital File, 1996*
Presence of tertiary care unit (=1)	County Hospital File, 1996*
Number of Medicare HMOs	HCFA HMO Service Area File, 9/98
Medicare HMO penetration (%)	HCFA HMO Service Area File, 9/98
Number of Medicare HMO enrollees	HCFA HMO Service Area File, 9/98
Number of Medicare beneficiaries	HCFA website
% of Medicare population male	Census Population Estimate, 1996*
% of Medicare population white	Census Population Estimate, 1996*
% of Medicare population under 75	Census Population Estimate, 1996*
% of Medicare population 75-84	Census Population Estimate, 1996*
Urban county (=1)	Economic Research Service, USDA*
Median household income	Census Bureau Estimate, 1995*
<b>Plan characteristics</b>	
Plan characteristics missing (=1)	InterStudy Competitive Edge 9.1
Model type	InterStudy Competitive Edge 9.1
IPA (=1)	InterStudy Competitive Edge 9.1
Network (=1)	InterStudy Competitive Edge 9.1
Mixed (=1)	InterStudy Competitive Edge 9.1
For profit (=1)	InterStudy Competitive Edge 9.1
Federally qualified (=1)	InterStudy Competitive Edge 9.1
Plan Medicare enrollment in county	HCFA HMO Service Area File, 9/98
Plan Medicare HMO penetration in county (%)	HCFA HMO Service Area File, 9/98

\* Released on Area Resource File, February 1999.

Note: The (=1) indicates that the variable is an indicator variable. For example, the For Profit variable is equal to 1 for observations on for-profit plans and equal to 0 for observations on nonprofit plans.

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